BHI-01739
Rev. 0

Temporary Sewage Holding Tank Engineering Report for the 100-B/C Area Remaining Pipelines and Sewers Project

Prepared for the U.S. Department of Energy, Richland Operations Office
Office of Environmental Restoration

Submitted by: Bechtel Hanford, Inc.

BHI-01739
Rev. 0
OU: 100-B/C
TSD: N/A
ERA: N/A

APPROVAL PAGE

Title: Temporary Sewage Holding Tank Engineering Report for the 100-B/C Area Remaining Pipelines and Sewers Project

Approval: F. M. Corpuz, Project Engineering

FM Corpuz
Signature

8-11-04
Date

BHI-DIS 8.12.04

The approval signature on this page indicates that this document has been authorized for information release to the public through appropriate channels. No other forms or signatures are required to document this information release.

BHI-01739
Rev. 0

Temporary Sewage Holding Tank Engineering Report for the 100-B/C Area Remaining Pipelines and Sewers Project

Author

C. A. Bentz
CH2M HILL Hanford, Inc.

Date Published

August 2004

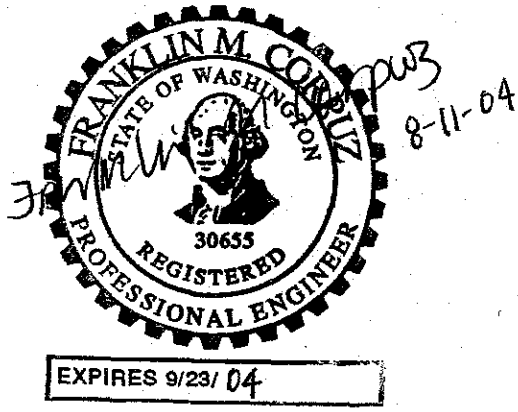


TABLE OF CONTENTS

METRIC CONVERSION CHART

Into Metric Units		
If You Know	*Multiply By*	*To Get*
Length		
inches	25.4	millimeters
inches	2.54	centimeters
feet	0.305	meters
yards	0.914	meters
miles	1.609	kilometers
Area		
sq. inches	6.452	sq. centimeters
sq. feet	0.093	sq. meters
sq. yards	0.836	sq. meters
sq. miles	2.6	sq. kilometers
acres	0.405	hectares
Mass (weight)		
ounces	28.35	grams
pounds	0.454	kilograms
ton	0.907	metric ton
Volume		
teaspoons	5	milliliters
tablespoons	15	milliliters
fluid ounces	30	milliliters
cups	0.24	liters
pints	0.47	liters
quarts	0.95	liters
gallons	3.8	liters
cubic feet	0.028	cubic meters
cubic yards	0.765	cubic meters
Temperature		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius
Radioactivity		
picocuries	37	millibecquerel

Out of Metric Units		
If You Know	*Multiply By*	*To Get*
Length		
millimeters	0.039	inches
centimeters	0.394	inches
meters	3.281	feet
meters	1.094	yards
kilometers	0.621	miles
Area		
sq. centimeters	0.155	sq. inches
sq. meters	10.76	sq. feet
sq. meters	1.196	sq. yards
sq. kilometers	0.4	sq. miles
hectares	2.47	acres
Mass (weight)		
grams	0.035	ounces
kilograms	2.205	pounds
metric ton	1.102	ton
Volume		
milliliters	0.033	fluid ounces
liters	2.1	pints
liters	1.057	quarts
liters	0.264	gallons
cubic meters	35.315	cubic feet
cubic meters	1.308	cubic yards
Temperature		
Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity		
millibecquerels	0.027	picocuries

1.0 GENERAL PLAN

This report is submitted for approval of a temporary sewage holding tank, which will serve the 100-B/C Area Remaining Pipelines and Sewers (RPAS) Project. The site is located approximately 50 km (31 mi) northwest of Richland, Washington, within Benton County.

Project support facilities are required for the RPAS Project. These facilities will provide office and workspace for the supervisors, engineers, technicians, and craft workers engaged in field work. The facilities will be temporary, modular buildings sized to accommodate the anticipated staff for approximately 2 years. Temporary utilities will be required to support the facilities. A mobile restroom trailer discharging to a below-grade temporary sewage holding tank will be used by the site workers. Wastewater production from the mobile restroom trailer is anticipated to occur 8 hours per day, 5 days per week.

1.1 WATER SOURCE

A temporary, above-grade potable water tank enclosure will supply water to the mobile restroom trailer. This potable water tank will have a capacity of 4,500 – 6,800 L (1,200 - 1,800 gal). Potable water usage is expected to occur 8 hours per day, 5 days per week.

1.2 WASTEWATER COLLECTION SYSTEM

The proposed wastewater collection system will utilize a nominal 11,356-L (3,000-gal), below-grade temporary sewage holding tank. A holding tank was chosen due to the temporary nature of the project and the lack of a sanitary sewer collection system and treatment plant within an economic distance. The holding tank will be used through the duration of the project. At the end of the RPAS Project, the need for continued use of the wastewater collection system for future 100-B/C Area remediation activities will be evaluated. The proposed temporary sewage holding tank system design will provide adequate capacity for the RPAS Project.

2.0 WASTEWATER STORAGE TANK LOCATION

2.1 LOCATION, LAND USE, AND CLIMATE

The proposed system will be located on the U.S. Department of Energy's Hanford Site in the 100-B/C Area, southwest of the 105-C Building, and within RPAS Project support facilities area (shown in Figure A-1 in Appendix A). The shortest distance to the Columbia River from the RPAS Project support facilities area is approximately 0.6 km (0.37 mi) to the north.

The site land use of the RPAS Project support facilities area and surrounding area is dedicated to environmental restoration.

The climate is semi-arid, with an annual average precipitation of 160 mm (6.3 in.). Temperature ranges from a winter extreme of -33°C (-27°F) to a summer extreme of 46°C (115°F).

2.2 GEOLOGY AND FLOODING POTENTIAL

The subsurface geology in the 100-B/C Area consists of three formations (listed in order from oldest to youngest): the Saddle Mountain Basalt of the Columbia River Basalt Group, the Ringold Formation, and the Hanford formation. The thickest sediments overlying the basalt at this location are approximately 183 m (600 ft).

The Hanford formation is the uppermost stratigraphic unit at the site and comprises most of the vadose zone. The thickness of this formation at the 100-B/C Area is not well defined; however, contact with the underlying Ringold Formation has been recorded at a depth of 17 m (56 ft) (DOE 1992).

The contact is unconformable and may be found at different depths at other locations because of scouring during the catastrophic flooding on the ancient Ringold surface. Data from monitoring wells near the support facility site indicate that the water table is approximately 19.8 m (65 ft) below grade.

Flooding analyses have been performed for the 100-B/C Area in connection with the environmental impact statement (EIS) for decommissioning the eight surplus production reactors. In the analyses, a standard project flood was defined as having a recurrence interval of 500 to 1,000 years and is, thus, equivalent to the critical flood defined in 10 *Code of Federal Regulations* (CFR) 1022. Consideration of the 500-year flood thereby automatically includes consideration of the 100-year flood. From analyses, a dam-regulated standard project flood would reach an elevation of 126.5 m (415 ft) at the 100-B/C Area. Because the holding tank site is at an approximate elevation of 152.5 m (500 ft), there is no flooding potential (DOE 1989).

3.0 DESIGN CRITERIA

3.1 TEMPORARY SEWAGE HOLDING TANK

All domestic sewage generated from the mobile restroom trailer will be collected in the proposed nominal 11,356-L (3,000 gal) temporary sewage holding tank. The tank is designed to be pumped every 7 days (5 working days), or as usage requires.

The holding tank shall be vented back through the drain pipe to the mobile restroom trailer to ensure proper venting of potential nuisance orders. The mobile restroom trailer shall have plumbing that is adequate to vent the holding tank.

3.2 QUALITY ASSURANCE

The proposed system will be procured and constructed in accordance with the technical specifications identified in Appendix A.

4.0 OPERATION AND MAINTENANCE

An operations and maintenance manual has been prepared that specifies inspection and pumping requirements, as prescribed by the design calculations, as well as specific requirements for inspections.

5.0 REFERENCES

10 CFR 1022, "Compliance with Floodplain and Wetland Environmental Review Requirements," *Code of Federal Regulations*, as amended.

DOE, 1989, *Environmental Impact Statement -- Decommissioning of Eight Surplus Production Reactors at the Hanford Site*, DOE/EIS-119D, U.S. Department of Energy, Washington, D.C.

DOE, 1992, *Remedial Investigation/Feasibility Study Work Plan for the 100-BC-1 Operable Unit*, DOE/RL-90-07, Rev. 0, U.S. Department of Energy, Richland, Washington.

6.0 BIBLIOGRAPHY

WDOH, 1999, *Holding Tank Sewage Systems, Recommended Standards and Guidance for Performance, Application, Design and Operation & Maintenance*, Washington State Department of Health, Olympia, Washington.

WAC 51-26, "Uniform Plumbing Code," *Washington Administrative Code*, as amended.

WAC 246-272-12501, "On-Site Sewage Systems," *Washington Administrative Code*, as amended.

OWNERSHIP

Owner: U.S. Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352
Attention: M.F. Jarvis
Telephone: (509) 376-2256

APPENDIX A

TECHNICAL SPECIFICATION FOR TEMPORARY SEWAGE HOLDING TANK AND INSTALLATION

TABLE OF CONTENTS

FIGURES

APPENDIX A
TECHNICAL SPECIFICATION FOR TEMPORARY SEWAGE HOLDING TANK AND INSTALLATION

A.1 GENERAL

A.1.1 Summary

This specification establishes the quality of materials and workmanship and defines the quality measures for providing and installing a single compartment, nominal 11,356-L (3,000-gal) temporary sewage holding tank complete with a level alarm system.

A.1.2 Abbreviations

The abbreviations listed below, used in this specification, shall have the following meanings:

AC	alternating current
ASTM	American Society for Testing and Materials
NEC	*National Electric Code*
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
NRTL	Nationally Recognized Testing Laboratory
PVC	polyvinyl chloride
UL	Underwriters' Laboratories
UPC	*Uniform Plumbing Code*
WAC	*Washington Administrative Code*

A.1.3 Codes, Standards, Laws, and Regulations

Unless otherwise approved or shown, the following codes, standards, laws, and regulations of the latest issue at the time of bid shall apply to establish the minimum requirements for installation of the holding tanks. Referenced test methods, specifications, and recommended practices are used to verify material properties and identify acceptable practices. Failure to identify applicable codes and standards does not imply elimination of required knowledge and compliance to perform work.

ASTM D1785	*Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120*
ASTM D2665	*Standard Specification for Polyvinyl Chloride (PVC) Plastic Drain, Waste and Vent Pipe and Fittings*
UPC	Uniform Plumbing Code

WAC 246-272 "On-Site Sewage Disposal"

A.2 MATERIALS AND EQUIPMENT

The holding tank shall be a nominal 11,356-L (3,000-gal), Evergreen Pre-Cast Inc., sewage tank, that is a single-compartment concrete holding tank with level alarms. The holding tank shall include an access riser and a pumping access riser with removable covers. Level alarms shall be as specified in Section A.2.1.

A 102-mm (4-in.), PVC pipe between the temporary sewage holding tank and the mobile restroom trailer shall be installed. The PVC piping shall conform to ASTM D2665.

Adhesive for joining the holding tank and access risers shall be IPS "Weld-On 810," a two-part plastic resin suitable for loose-fitting joints with gaps, or as approved.

Bedding and backfill material for the holding tank and PVC piping shall be ¾ in., minus crushed gravel.

Concrete for the washdown pad and the bollards shall have a minimum 28-day compressive strength of 20,684 Pa (3,000 psi).

Bollards shall be 1.83-m (6-ft) by 101.6-mm (4-in) Schedule 40 steel pipe, painted yellow.

All materials used for installation shall be suitable for outdoor and/or underground service.

A.2.1 Fabricated Control Panel – Holding Tank Level Alarm System

Provide all materials, equipment, wiring, conduits, equipment supports, and installation tools necessary for a complete system installation of the holding tank level alarm system.

The control panel and materials manufactured within the scope of UL or another NRTL shall conform to UL or NRTL standards and have an applied UL or NRTL listing mark. References to UL throughout this section imply conformity with UL or NRTL standards and guidelines.

The control panel shall be manufactured, assembled, tested, approved, and clearly labeled in accordance with UL 508A, or another inspection agency recognized by the State of Washington prior to delivery to construction site.

In addition, electrical enclosures and materials installed shall be approved for the area of classification in accordance with NFPA 820, *Fire Protection in Wastewater Treatment and Collection Facilities*; and NEC Articles 500 and 501.

A.2.1.1 Submittals. Provide a submittal for review and approval of all the major components of the tank level alarm system. Fabrication of the panel shall not begin until the submittal is

approved. Submittals shall be submitted to Bechtel Hanford, Inc. in accordance with Exhibit "I," Subcontractor Submittal Requirements Summary. Submittals that do not meet the project requirements shall be rejected. Rejected submittals shall be resubmitted in a timely manner to avoid delays. The submittal shall include, but are not limited to, data sheets and/or catalog sheets for the following items:

- One-line diagram and control diagram
- Control panel enclosure
- Control panel fabrication drawings with details on all relays, terminal blocks, conductors, and grounding
- Float switches
- Intrinsic safety barriers for float switch termination
- Power disconnect switch
- Warning light
- Hand switches and indicator lights

A.2.1.2 Control Panel Enclosure. The control panel enclosure shall be a NEMA 250, Type 4 panel with manufacturer's standard finish interior and exterior. Panel metal thickness shall be 14-gauge minimum. Panel door shall have stainless-steel, quick-release clamps and allow for front access. All panel cutouts shall be cut, punched, or drilled and finished smoothly with rounded edges. Panels shall be as manufactured by Hoffman or H.F. Cox, or approved equivalent.

A.2.1.3 Control Panel - Special Construction Requirements. The level alarm control panel shall have an alarm horn, a warning light, an acknowledge button, a reset button, and status lights for each of the two float switches. Below the status lights, provide two labels as follows: the first label shall read "NORMAL OPERATIONS VOLUME – HIGH LEVEL ALARM," and the second label shall read "RESERVE STORAGE VOLUME – HIGH-HIGH LEVEL ALARM." See Section A.2.1.7, "Level Alarm System Operation," for the required functionality of these components.

Provide and install intrinsic safety barriers between the hazardous area (i.e., sewage holding tank) and the safe area (i.e., control panel). Use intrinsically safe relays to monitor discrete signals (float switches status) that originate in hazardous area and are used in a safe area. Relays shall be as manufactured by MTL, Inc.; Series MTL 2000, or approved equivalent.

Provide and install conduit seals for the conduits that carry the float switch cables.

A.2.1.4 Alarm Horn. The alarm horn shall have a sound output level of 100 decibels nominal at 3 m (10 ft). The horn shall have a stainless-steel diaphragm. The horn shall have a NEMA 4X enclosure and use a 120 volt AC power supply. The alarm horn shall be Model 350WB, as manufactured by Federal Signal Corp, or approved equivalent.

A.2.1.5 Level Switches. Level switches shall be direct-acting float type with enclosed mercury switch and integral cable. The float shall be a 114-mm (4.5-in.)-diameter polypropylene body with a 25-mm (1-in.) maximum differential between its open and closed position. Switch contact shall be an isolated type rated for 4.5 amps continuous at 120 volts AC. Provide mounting pipe with corrosion proof hardware to mount level switches within sewage holding tank. Level switches shall be as manufactured by Anchor Scientific; Roto-Float, Type P/Type S, or approved equivalent.

A.2.1.6 Warning Light. The warning light for mounting on top of the level control panel shall be a rotating reflector or flashing bulb type (90 flashes per minute). Light shall be designed for exterior service and shall have an amber polycarbonate dome. The lamp shall be a 25-watt incandescent type. The warning light shall be as manufactured by Federal Signal, Model 225, or approved equivalent.

A.2.1.7 Level Alarm System Operation. Assemble the control panel to provide alarms based upon high-level and high-high-level float switch actuation inside the sewage storage tank as a means of monitoring liquid levels in the tank. Provide interface devices enabling an operator to acknowledge, silence, and reset high-level and high-high-level alarm conditions at the control panel assembly.

Assemble controls so, in the event the high-level float switch is actuated, the high-level alarm status light shall illuminate, as well as a warning light on top of the panel, and the alarm horn shall sound. The operator shall acknowledge high-level alarm condition at the control panel assembly. Once acknowledged, the alarm horn shall silence and the warning light will de-energize, but the high-level alarm status light shall remain lighted. In the event the high-high-level float switch is actuated, the high-high-level alarm light shall illuminate, the alarm light shall energize, and the alarm horn shall sound. The operator shall acknowledge the high-high-level alarm condition at the control panel assembly. Once acknowledged, the alarm horn shall silence and the warning light shall de-energize, but the high-high-level alarm status light shall remain lighted. The alarm status lights shall remain illuminated until respective level float switches are de-actuated and alarm conditions are reset at the control panel assembly. Float switches will only be deactivated by removing liquid from the holding tank below the float switch set points.

A.3 EXECUTION

A.3.1 Installation Requirements

The holding tank shall be located within the RPAS Project support facilities area and configured as generally depicted in Figure A-1.

Excavation for the holding tank shall allow for a minimum bedding depth of 152 mm (6 in.), as shown in Figure A-2. Bedding material shall be placed, leveled, and compacted prior to installing the tank.

The tank shall be installed on a level, prepared base. No voids shall be present under the tank.

Prior to installing the access risers, a check fit of the riser to the receiving collar shall be performed to ensure proper seating and insertion.

Cement access riser components or otherwise seal the joints in accordance with manufacturer's recommendations. All joints shall be watertight.

The holding tank shall be installed so the cover for the access riser is flush with the washdown pad. The holding tank shall be installed with a minimum cover of 305 mm (12 in.). Of this cover, a minimum of 152 mm (6 in.) of bedding material shall be used on top of the tank, with the balance provided by previously excavated material 52 mm (2 in.) or smaller. Backfill shall be compacted in 305-mm (12-in.) lifts using a hand-guided tamper and making a minimum of two complete passes over the entire exposed surface. Backfill material shall be placed uniformly around the holding tank, and each lift shall be completely compacted prior to placing the next lift.

The washdown concrete pad shall be installed on top of the temporary sewage holding tank, as shown in Figure A-2.

Excavation for the PVC service connection piping shall allow for a minimum bedding depth of 102 mm (4 in.).

The PVC piping from the temporary sewage holding tank to the mobile restroom trailer stub down shall be connected with a minimum slope of 20 mm/m (1/4 in/ft). Prior to backfilling, the drain shall be filled with water and visually inspected for leaks.

A.3.2 Holding Tank Alarm System Installation

A.3.2.1 Control Panel Installation. The level alarm system control panel installation shall be completed in accordance with NEC and applicable local electrical codes. In addition, the panel shall be located a minimum of 3 m (10 ft) away from either access hatch to the sewage holding tank. The panel shall be securely mounted to an adjacent structure or stanchion mounted using Unistrut-type channels. Power from the control panel shall be extended from the mobile restroom trailer and be provided with a local disconnect switch, which is mounted with the

control panel. The disconnect switch shall be mounted in a NEMA 4 enclosure. Power and level switch conductors, either buried or exposed, shall be installed inside conduit. Direct burial of cable shall not be acceptable.

Provide conduit seals for each conduit between the sewage storage tank and the alarm system control panel in accordance with the requirements of NEC Articles 500 and 501. Conduit seals, when properly installed, will prevent movement of potential Class 1, Groups B, C, and D gases between the storage tank headspace and the control panel.

A.3.2.2 Float Switch Installation. Install float switches to actuate the high-level alarm (associated with normal operations volume) when the tank contents is at a level equal to 6,757 L (1,785 gal). The second float switch shall be installed to actuate the high-high-level alarm at a tank level that equals a total liquid volume of 10,811 L (2,856 gal). The high-high-level represents approximately the sum of the estimated normal operations volume of 6,757 L (1,785 gal) and the reserve storage volume of 4,054 L (1,071 gal). The float switches shall be installed using manufacturer-supplied hardware and shall be positioned so the floats can be reached from a position outside of the tank through the tank's access riser.

The steel bollards shall be installed as shown in Figure A-1.

A.3.3 Testing and Certification

Following tank and level alarm panel installation, the tank level float switches shall be hand-activated to test audible and visual alarms.

Prior to backfilling, all drain piping shall be leak tested with water at a minimum head of 3 m (10 ft) for 1 hour, and all pressure piping shall be leak tested at a minimum pressure of 345 Pa (50 psi) for 1 hour. There shall be no visible leaks.

A.3.4 Quality Assurance/Quality Control

All activities related to holding tank installations shall conform to stated quality, technical, and performance objectives.

A.4 REFERENCES

ASTM D1785, *Standard Specification for Polyvinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

ASTM D2665, *Standard Specification for Polyvinyl Chloride (PVC) Plastic Drain, Waste and Vent Pipe and Fittings*, American Society for Testing and Materials, West Conshohocken, Pennsylvania.

National Electrical Code, National Fire Protection Association, Quincy, Massachusetts.

NFPA 820, *Fire Protection in Wastewater Treatment and Collection Facilities*, National Fire Protection Association, Quincy, Massachusetts.

Uniform Plumbing Code, International Association of Plumbing and Mechanical Officials, Northwest Regional Office, Walnut, California.

WAC 246-272, "On-Site Sewage Systems," *Washington Administrative Code*, as amended.

Figure A-1. 100-B/C Area Remaining Pipelines and Sewers – Site Map.

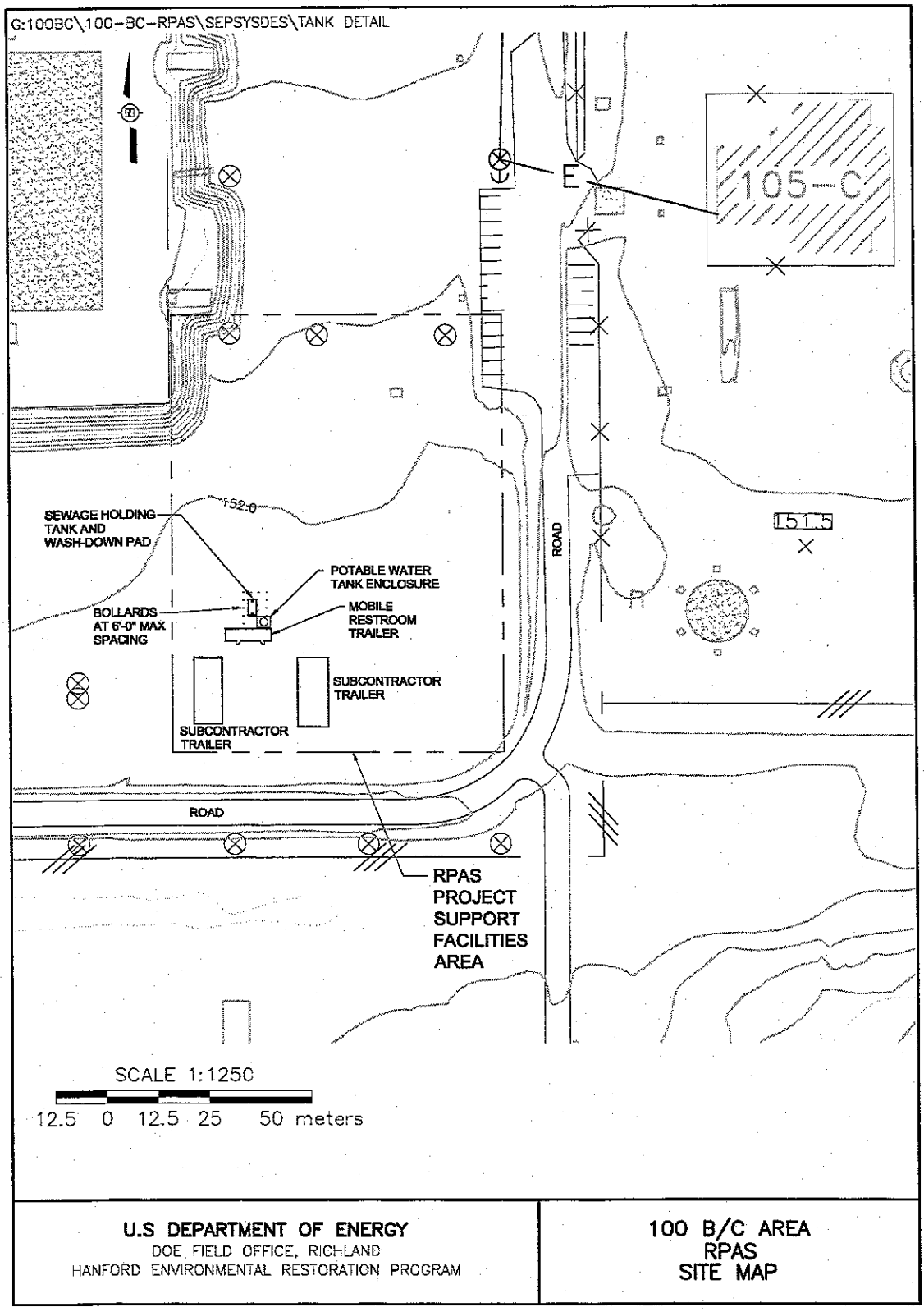


Figure A-2. 100-B/C Area Remaining Pipelines and Sewers – Septic Tank Section.

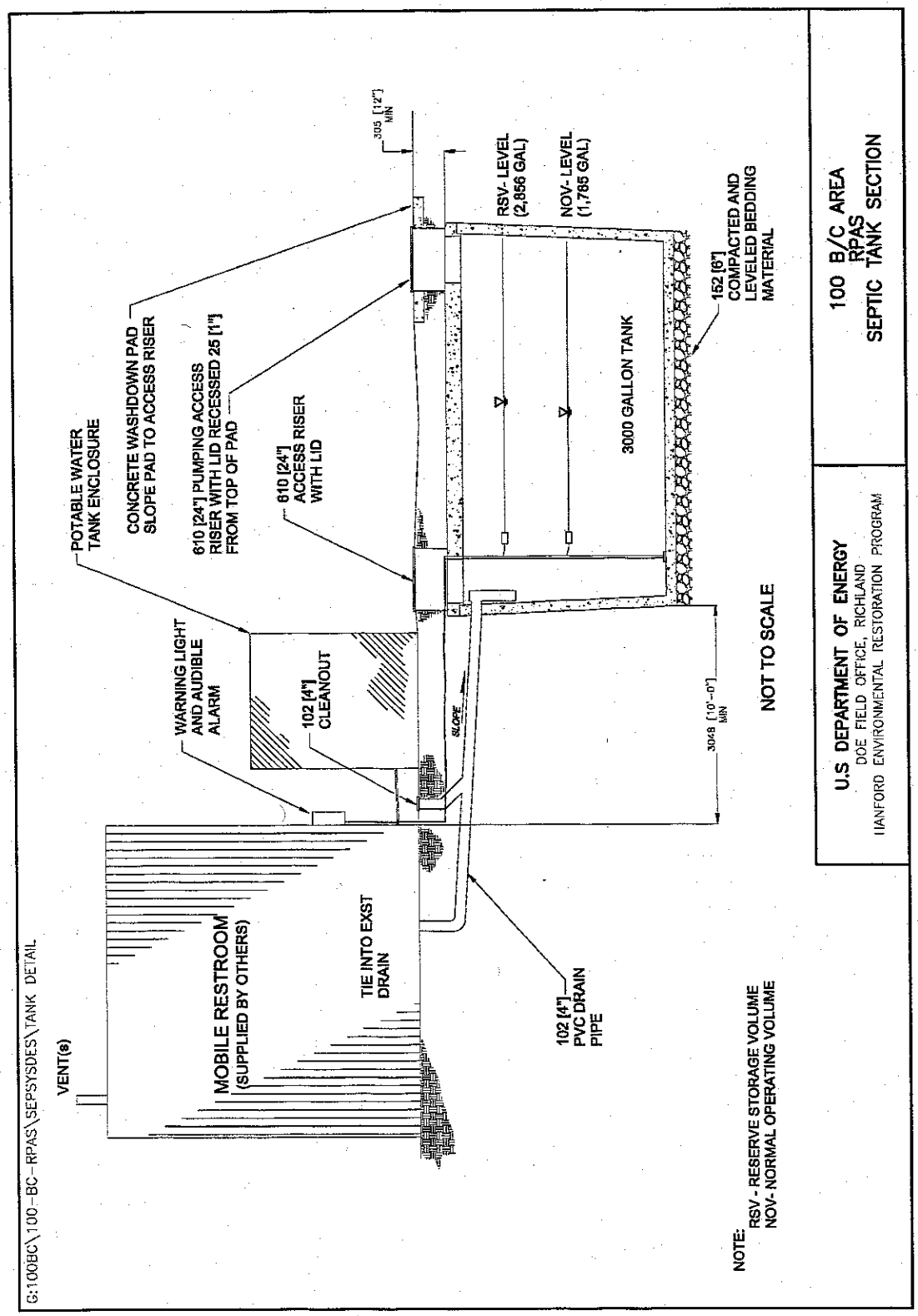
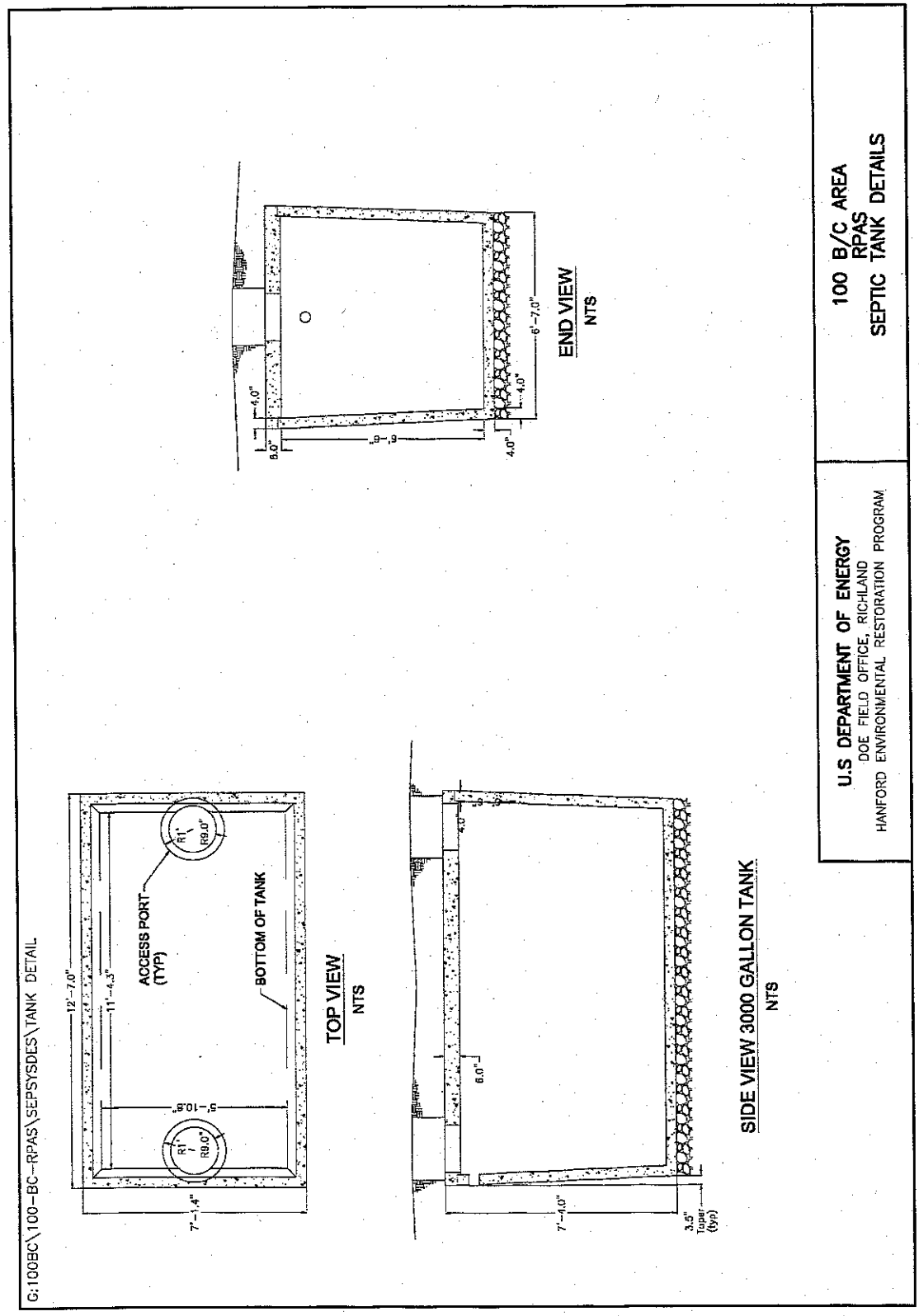


Figure A-3. 100-B/C Area Remaining Pipelines and Sewers – Septic Tank Details.



APPENDIX B

DESIGN CALCULATION

Cover

Subject: Estimate Liquid Volume Capacity of Holding Tank

Computer Program: Excel **Program No.** Office 97

Committed Calculation ■ **Preliminary** ☐ **Superseded** ☐

Use of this calculation by persons who do not have access to all of the pertinent facts could lead to incorrect conclusions or assumptions. Before applying this calculation in your work, this calculation must be thoroughly reviewed with appropriate and authorized Hanford site ERC personnel. Without this review, the ERC cannot assume any responsibility for the use of these calculations.

Rev.	Sheets	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Calc. = 2 Total = 3	7/13/04 CA Bentz	BACH 7/15/2004 BA Christensen	7/19/04 JN Winters	FM Corpuz	7/22/04

SUMMARY OF REVISIONS

* Obtain Calc. No. from DIS

BHI-DE-01, EDPI-4.37-01, DE01437.03

0100B-CA-C0020_rev0.xls

Problem Statement

Bechtel Hanford, Inc. **CALCULATION SHEET** **ERC TEAM**

Originator: CA Bentz CAB Date: 7/13/2004 Calc. No. 0100B-CA-C0020 Rev. No. 0
Project: 100-B/C RPAS Holding Tank Sewage System Job No. 22192 Checked BA Christensen Date: 9/15/04
Subject: Estimate Liquid Volume Capacity of Holding Tank Sheet No. 1 of 2

Problem:
Determine the technical basis for sizing the Holding Tank Sewage System for the mobile restroom trailer to be designed for the 100 B/C RPAS Remedial Action Project.

Criteria:
The Holding Tank Sewage System is to be designed and permitted in accordance with Washington State Department of Health (WSDOH) requirements and guidelines.

Special Considerations and Assumptions:

1.) Design occupancy will be for 40 people including men and/or women, craft and/or office workers and
2.) Using the State of Washington's maximum of 6 liters (1.6 gallon)/flush for toilets and 3.8 liters (1.0 gallon) flush for urinals we can assume a worst case of 1.6 gallon/flush for both toilets and urinals.
3.) A potable water above ground tank will be provided for restroom hand washing and other sanitary water needs. The faucets will assume to be rated at 9.5 liters (2.5 gallons) per minute. The typical time spent washing hands is about 15 seconds per individual per restroom visit. This occurs an estimated every 2 hours per day.
4.) Work schedule is based on a 8 hour day.
5.) These assumptions do not include any portable restrooms which decrease the system loading.

Method Of Analysis:

The calculation for sizing the Holding Tank Sewage System will be performed by using Excel.

Given Data:

Number of people = 40
Visits per day = 4
Volume/flush = 6.06 liters (1.6 gallons)
Faucet Rating = 9.46 liters per minute (2.5 gallons per minute)
Time/Wash = 15 seconds
Volume/Wash = 2.38 liters (0.63 gallons)

Contents:

Problem Statement (2)

Bechtel Hanford, Inc. **CALCULATION SHEET** **ERC TEAM**

Originator: CA Bentz Date: 7/13/2004 Calc. No. 0100B-CA-C0020 Rev. No. 0
Project: 100-B/C RPAS Holding Tank Sewage System Job No. 22192 Checked BA Christensen Date: 7/15/04
Subject: Estimate Liquid Volume Capacity of Holding Tank Sheet No. 2 of 2

Daily Sewage Flow (DSF)

(People x Visits x Flush) = 969 liters (256 gallons)
+
(People x Visits x Wash) = 382 liters (101 gallons)

= 1,351 liters per day (357 gallons per day)

Pump Service Frequency (PSF)

PSF = 5 working days

Normal Operations Volume (NOV)

(DSF x PSF) = 6,757 liters (1,785 gallons)

Reserve Storage Volume (RSV)

3 x DSF = 4,054 liters (1,071 gallons)

Total Liquid Volume Capacity (TLVC)

(NOV + RSV) = 10,811 liters (2,856 gallons)

Results Summary:

It is determined that the Holding Tank Sewage System will store the weekly Normal Operation Volume and the Reserve Storage Volume equal to 2,856 gallons of liquid. This liquid will be pumped on a weekly basis. A state approved 3,000 gallon pre-cast concrete tank will be used for this system.

0100B-CA-C0020_rev0.xls

DISTRIBUTION

ERC Team

J. W. Donnelly (BHI) (8)	X0-17
J. G. Woolard (BHI)	H9-03
J. S. Decker (BHI)	X0-17
F. M. Corpuz (BHI)	X0-17
C. A. Bentz (CHI)	H9-02
M. R. Coy (CHI)	H9-02
E. G. Ison (BHI)	X9-08
Document and Information Services (3)	H9-04
DOE-RL Public Reading Room	H2-53
Hanford Technical Library	P8-55